Fall 2014

Parting Thoughts - So Much More to Discover

Eric L. Mann
Hope College, mann@hope.edu

Eric L. Mann
Hope College
mann@hope.edu

Parting Thoughts—So Much More to Discover

When first approached about writing a column on math for *Teaching for High Potential* I was a bit surprised and did not imagine I would be afforded the opportunity to share my thoughts with the readership over the next seven years. As I sit down to put pixels on an LED screen for my last column it only seems fitting that I return to my early days as a student teacher. That year I had several students who forever changed my views of mathematics—both its nature and how we best learn and teach it. Several of those experiences are buried deep in past iMathination columns.

I was always good at school mathematics so I was anxious to share with my future students all that I had learned. I was the product of a very traditional math education approach, the teacher would show us how to get the right answers, we practiced similar problems until she was sure we "got it" and then did all the problems at the end of the section that did not have answers at the back of the book. All pieces did not begin to fall into place for me until well after I left college; a process that is still unfolding. In his introduction to *How Not to Be Wrong: The Power of Mathematical Thinking* (2014) Jordan Ellenberg[1], a mathematician and professor, at the University of Wisconsin, Madison, shares his answer to the "When am I going to use this?" question that all teachers have heard. It begins with "Mathematics is not just a sequence of computations to be carried out by rote until your patience or stamina runs out—although it may seem that way from what you've been taught in courses called *mathematics*" (p.2). His book then discusses a number of actual examples of how without an understanding of mathematics answers to real world questions that seem to be correct can be wrong—often with drastic outcomes; a recommended read for both teachers and students of mathematics.

On a first day in my 7th grade math classroom several students wanted to make sure I knew they were not good at mathematics and that I should not have high expectations for their success that year. My response was "how do you know, when have you never done math?" Their responses all focused on speed of computation, memorization of facts and rules, and getting the answer the teacher expected. Not unlike the responses I got from some of my prospective K-8 teachers last fall. It is a shame that at an early age our children have reduced mathematics to "a highly sophisticated intellectual game in which the adepts display their skill by tacking invented problems."[2]

In a roundabout way all these bits and pieces of thoughts brought me back to a student of mine in my first year as a classroom teacher. She was an exceptional young lady gifted in so many ways but had slipped through the cracks as she had learned to play the intellectual game we called school and could keep herself entertained with her poetry after she quickly finished the day's assigned tasks. At first I was content to grant her the freedom to pursue her passion of the moment but as I got to know her better I found myself trying to find ways to link her interests and my passion for mathematics as, by all measures we valued in school, she was an exceptional math student. What was missing for her was an answer to the "when are we ever going to use this" question. For her a partial answer came the day I stumbled on a project in an old Math Counts coaches guide on bedroom renovations. Not too surprising that a fifth grade girl had ideas on how she might improve her living space. What was surprising was how voraciously she tackled the project. She had her parents take her to building supply stores; she did cost trade off analyses, looked at structural loads, developed budgets and plans and carried out the project. Writing and poetry were still her first love, but math provided her the tools to design an environment where she was inspired to create. Along the way she glimpsed the true nature of mathematics in applications in her world, not the invented one of the classroom.

In the closing pages of his book Ellenberg writes, "Every mathematician creates new things, some big, some small. All mathematical writing is creative writing. And the entities we can create mathematically are subject to no physical limits; they can be finite or infinite, they can be realizable in our observable universe or not…What's true is that the sensation of mathematical understanding—of suddenly knowing what's going on, with total certainty, *all the way to the bottom*—is a special thing, attainable in few if any other place in life" (p. 436-437). Teaching mathematics the way I was taught as a child or the way I approached my first year as a classroom teacher is like visiting a coral reef but never going beneath the surface of the ocean to see all the beauty hidden from us. And the beauty is there as much for the first grader who is learning the organization and structure of our place value system as the AP Calculus students who gain insight into Cauch's notion of limits and its impact on Newton's fluxions (see Ellenberg, p 39–49).

The deeper I dig into the nature of mathematics the more I appreciate all that mathematics has contributed to our understanding of the world we live in. Those are the connections we need to help our students discover. **THP**

---

[1]A quick look at his blog www.jordanellenberg.com/about/ and most will agree Jordan would have been a good fit in in a GT classroom.

[2]Polkinghorne, J. (2011). Introduction (p 1-2). In J. Polkinghorne (Ed.), *Meaning in mathematics*. New York, NY: Oxford University Press.